

CLAIMS

WHAT IS CLAIMED IS:

- 10 1. An optical network system for supporting multiple service providers, comprising:
- a data service hub comprising:
- a first optical transmitter for modulating a first analog optical carrier having a first wavelength with a first electrical broadcast signal;
- 15 a second optical transmitter a second analog optical carrier having a second wavelength with the second electrical broadcast signal;
- a first optical waveguide coupled to the data service hub and a laser transceiver node for receiving the first analog optical carrier and propagating it to the laser transceiver node;
- 20 a second optical waveguide coupled to the data service hub and the node for receiving the first analog optical carrier and propagating it to the laser transceiver node, the node comprising a combiner for mixing the first and second analog optical carriers;
- a third optical waveguide coupled to the laser transceiver node and a
- 25 subscriber optical interface for receiving the combined first and second analog optical carriers and propagating them to the subscriber optical interface; and
- the subscriber optical interface comprising a service provider selection device for selecting one of the analog optical carriers.
- 30 2. The system of Claim 1, wherein the subscriber optical interface comprises an analog optical receiver for converting the selected analog optical carrier into electrical broadcast signals.
- 35 3. The system of Claim 1, further comprising a broadcast receiver for demodulating electrical broadcast signals.
4. The system of Claim 1, wherein the service provider selection device comprises an optical filter.

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5. The system of Claim 1, wherein the laser transceiver node comprises a wavelength division multiplexer for combining the first and second analog optical carriers.

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6. The system of Claim 1, wherein the laser transceiver node comprises an optical diplexer for mixing the first and second analog optical carriers together with a digital optical carrier.

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7. The system of Claim 1, wherein the subscriber optical interface comprises an optical diplexer for separating the first and second analog optical carriers from a digital optical carrier.

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8. The system of Claim 1, wherein the broadcast signals comprise at least one of analog television broadcast signals, analog radio broadcast signals, and high density television broadcast signals.

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9. A method for supporting broadcast signals from multiple sources operating within a single optical network, comprising:

modulating a first analog optical carrier having a first wavelength with a first electrical broadcast signal at a data service hub;

10 modulating a second analog optical carrier having a second wavelength with the second electrical broadcast signal at the data service hub;

propagating the first and second analog optical carriers through separate optical waveguides away from the data service hub;

combining the first and second analog optical carriers;

15 propagating the first and second analog optical carriers through one optical waveguide towards a subscriber; and

selecting one of the analog optical carriers at a subscriber optical interface.

20 10. The method of Claim 9, further comprising converting the selected analog optical carrier into electrical broadcast signals.

11. The method of Claim 10, further comprising demodulating the electrical broadcast signals with a broadcast receiver.

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12. The method of Claim 9, wherein selecting one of the analog optical carriers at the subscriber optical interface comprises selecting one of the analog optical carriers by optical filtering.

30 13. The method of Claim 9, wherein combining the first and second analog optical carriers comprises combining the optical signals through wavelength division multiplexing.

14. The method of Claim 9, further comprising combining the first and
35 second analog optical carriers with a digital optical carrier.

- 5 15. The method of Claim 14, further comprising separating the first and second analog optical carriers from the digital optical carrier at a subscriber optical interface.

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16. A system for supporting broadcast signals from multiple service providers operating within a single optical network, comprising:

a data service hub comprising:

10 a first optical transmitter for modulating a first analog optical carrier having a first wavelength with a first electrical broadcast signal;

a block converter for translating a frequency range of a second electrical broadcast signal;

a second optical transmitter for modulating a second analog optical carrier having a second wavelength with the second electrical broadcast signal;

15 a combiner for mixing the first and second analog optical carriers;

a first optical waveguide for communicating the first and second analog optical carriers to a node; and

20 a subscriber optical interface coupled to the node and comprising a service provider selection device for selecting one of the analog optical carriers.

17. The system of Claim 16, wherein the subscriber optical interface further comprises an analog optical receiver for converting the selected analog optical carrier into electrical broadcast signal.

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18. The system of Claim 16, wherein the service provider selection device comprises a block converter.

19. The system of Claim 16, further comprising a broadcast receiver for 30 demodulating electrical broadcast signals.

20. The system of Claim 16, wherein the service provider selection device comprises an optical filter.

35 21. The system of Claim 16, wherein the combiner comprises a wavelength division multiplexer.

5 22. The system of Claim 16, wherein the node further comprises a diplexer
for mixing the first and second analog optical carriers with a digital optical carrier.

 23. The method of Claim 16, wherein the subscriber optical interface
comprises a diplexer for separating the first and second analog optical carriers from
10 digital optical carrier.

 24. The system of Claim 16, wherein the broadcast signals comprise at
least one of analog television broadcast signals, analog radio broadcast signals, and
high density television broadcast signals.

15 25. The system of Claim 16, wherein the service provider selection device
comprises a block converter, the block converter comprising a local oscillator, a
mixer, and a filter.

- 5 26. A method for supporting broadcast signals from multiple service
providers operating within a single optical network, comprising:
 modulating a first analog optical carrier having a first wavelength with
a first electrical broadcast signal at a data service hub;
 translating a frequency range of a second electrical broadcast signal;
10 modulating a second analog optical carrier having a second wavelength
with the second electrical broadcast signal at the data service hub;
 combining the first and second analog optical carriers at the data
service hub;
 propagating the first and second analog optical carriers through one
15 optical waveguide towards a subscriber; and
 selecting one of the analog optical carriers at a subscriber optical
interface.
27. The method of Claim 26, further comprising converting the selected
20 analog optical carrier into electrical broadcast signal.
28. The method of Claim 26, further comprises translating a frequency
range of the converted electrical broadcast signal.
- 25 29. The method of Claim 26, further comprising demodulating the
electrical broadcast signals with a broadcast receiver.
30. The method of Claim 26, wherein selecting one of the analog optical
carriers at the subscriber optical interface comprises selecting one of the analog
30 optical carriers by optical filtering.
31. The method of Claim 26, wherein combining the first and second
analog optical carriers comprises combining the optical signals through wavelength
division multiplexing.
- 35 32. The method of Claim 26, further comprising combining the first and
second analog optical carriers with a digital optical carrier.

- 5 33. The method of Claim 26, further comprising separating the first and second analog optical carriers from the digital optical carrier at a subscriber optical interface.

- 5 34. A system for supporting broadcast signals from multiple service
providers operating within a single optical network, comprising:
 a data service hub comprising:
 a block converter for translating a frequency range of a first
electrical broadcast signal;
10 an electrical combiner for combining the first electrical
broadcast signal with a second electrical broadcast signal;
 an optical transmitter for modulating an analog optical carrier
with the combined first and second electrical broadcast signals; and
 an optical waveguide for communicating the analog optical carrier to a
15 subscriber optical interface; the subscriber optical interface comprising a service
provider selection device for choosing one of the analog optical carriers.
35. The system of Claim 34, wherein the subscriber optical interface
comprises an analog optical receiver for converting the selected analog optical carrier
20 into an electrical broadcast signal.
36. The system of Claim 34, wherein the subscriber optical interface
further comprises a block converter for translating a frequency range of electrical
broadcast signals.
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37. The system of Claim 34, wherein the subscriber optical interface
further comprises a broadcast receiver for demodulating electrical broadcast signals.
38. The system of Claim 34, wherein service provider selection device
30 comprises a block converter.
39. The system of Claim 34, further comprising a combiner for mixing the
analog optical carrier with a digital optical carrier.
- 35 40. The system of Claim 34, wherein the subscriber optical interface
comprises a diplexer for separating the analog optical carrier from a digital optical
carrier.

- 5 41. A method for supporting broadcast signals from multiple service
providers operating within a single optical network, comprising:
 generating a first electrical broadcast signal;
 translating a frequency range of second electrical broadcast signal;
 combining the first and second analog electrical signals at the data
10 service hub;
 modulating an analog optical carrier with the first and second electrical
broadcast signals at the data service hub;
 propagating the analog optical carriers through one optical waveguide
towards a subscriber; and
15 selecting one of the analog optical carriers at a subscriber optical
interface.
42. The method of Claim 41, further comprising converting the selected
analog optical carrier into an electrical broadcast signal.
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43. The method of Claim 41, further comprising translating a frequency
range of the converted electrical broadcast signal.
44. The method of Claim 41, further comprising demodulating the
25 electrical broadcast signals with a broadcast receiver.
45. The method of Claim 41, wherein selecting one of the analog optical
carriers at the subscriber optical interface comprises translating a frequency range of
the converted electrical broadcast signal.
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46. The method of Claim 41, further comprising combining the analog
optical carrier with a digital optical carrier.
47. The method of Claim 41, further comprising separating the analog
35 optical carrier from the digital optical carrier at a subscriber optical interface.

48. A system for supporting broadcast signals from multiple service providers operating within a single optical network, comprising:

a data service hub comprising:

an first optical transmitter for modulating a first analog optical carrier having a first wavelength with a first electrical broadcast signal, the first electrical broadcast signal having a first frequency range occupied by analog broadcast signals and a second frequency range occupied by digital broadcast signals;

a second optical transmitter for modulating a second analog optical carrier having a second wavelength with a second electrical broadcast signal, the second electrical broadcast signal having a first frequency range occupied by digital broadcast signals and a second frequency range occupied by analog broadcast signals, the frequency ranges of the second electrical broadcast signal being opposite to the frequency ranges of the first electrical broadcast signal at least in some channels;

a combiner for mixing the first and second analog optical carriers;

an optical waveguide for communicating the first and second analog optical carriers from the data service hub to a subscriber optical interface, the subscriber optical interface comprising a service provider selection device.

49. The system of Claim 48, wherein the subscriber optical interface further comprises an analog optical receiver for converting the selected analog optical carrier into an electrical broadcast signal .

50. The system of Claim 48, wherein the service provider selection device comprises an optical filter.

51. The system of Claim 48, further comprising a broadcast receiver for demodulating electrical broadcast signals.

52. The system of Claim 48, further comprising a diplexer for combining the analog optical carrier with a digital optical carrier.

- 5 53. The system of Claim 48, wherein the subscriber optical interface further comprises a diplexer for separating the analog optical carrier from digital optical carrier.

5 54. A method for supporting broadcast signals from multiple service
providers operating within a single optical network, comprising:
 selecting a first frequency range for a first electrical broadcast signal;
 selecting a second frequency range for a second electrical broadcast
signal that is different from the first frequency range;
10 modulating a first analog optical carrier having a first wavelength with
the first electrical broadcast signal at a data service hub;
 modulating a second analog optical carrier having a second wavelength
with the second electrical broadcast signal at the data service hub;
 propagating the first and second analog optical carriers through one
15 optical waveguide towards a subscriber; and
 selecting one of the analog optical carriers at the subscriber.

 55. The method of Claim 54, further comprising combining the first and
second analog optical carriers at the data service hub.

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 56. The method of Claim 54, further comprising converting the selected
analog optical carrier into an electrical broadcast signal.

 57. The method of Claim 54, wherein selecting one of the analog optical
25 carriers at subscriber comprises selecting one of the analog optical carriers by optical
filtering .

 58. The method of Claim 54, further comprising demodulating the
electrical broadcast signals with a broadcast receiver.

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 59. The method of Claim 54, further comprising combining the analog
optical carrier with a digital optical carrier.

 60. The method of Claim 59, further comprising separating the analog
35 optical carrier from the digital optical carrier at the subscriber.

61. A method for supporting broadcast signals from multiple service providers operating within a single optical network, comprising:

generating a first and second electrical broadcast signals;

locking a phase of the second electrical broadcast signal relative to a phase of the first electrical broadcast signal;

modulating a first analog optical carrier having a first wavelength with the first electrical broadcast signal at a data service hub;

modulating a second analog optical carrier having a second wavelength with the second electrical broadcast signal at the data service hub;

propagating the first and second analog optical carriers through one optical waveguide towards a subscriber; and

selecting one of the analog optical carriers at the subscriber.

62. The method of Claim 61, further comprising combining the first and second analog optical carriers at the data service hub.

63. The method of Claim 61, further comprising converting the selected analog optical carrier into an electrical broadcast signal.

64. The method of Claim 61, wherein selecting one of the analog optical carriers at subscriber comprises selecting one of the analog optical carriers by optical filtering.

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65. A method for supporting broadcast signals from multiple service providers operating within a single optical network, comprising:

generating a first and second electrical broadcast signals;

10 off setting a frequency of the second electrical broadcast signal relative to the first electrical broadcast signal by a predetermined amount;

modulating a first analog optical carrier having a first wavelength with the first electrical broadcast signal at a data service hub;

modulating a second analog optical carrier having a second wavelength with the second electrical broadcast signal at the data service hub;

15 propagating the first and second analog optical carriers through one optical waveguide towards a subscriber; and

selecting one of the analog optical carriers at the subscriber.

20 66. The method of Claim 65, further comprising combining the first and second analog optical carriers at the data service hub.

67. The method of Claim 65, further comprising converting the selected analog optical carrier into an electrical broadcast signal.

25 68. The method of Claim 65, wherein selecting one of the analog optical carriers at subscriber comprises selecting one of the analog optical carriers by optical filtering.

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69. An optical network system for supporting multiple service providers, comprising:

a first data service hub for supplying a first set of video services comprising:

10 a first optical transmitter for modulating a first analog optical carrier having a first wavelength with a first electrical broadcast signal;

a second data service hub for supplying a second set of video services comprising:

15 a second optical transmitter a second analog optical carrier having a second wavelength with a second electrical broadcast signal;

an optical waveguide communicating the first and second optical carriers between the first data service hub and the second data service hub.

70. The system of Claim 69, further comprising a subscriber optical
20 interface that includes a service provider selection device for selecting one of the analog optical carriers.

71. The system of Claim 70, wherein the service provider selection device comprises an optical filter.

72. A method for supporting broadcast and data services from multiple sources operating within a single optical network, comprising:

modulating a first analog optical carrier having a first wavelength with a first electrical broadcast signal at a data service hub;

10 modulating a second analog optical carrier having a second wavelength with the second electrical broadcast signal at the data service hub;

modulating a digital optical carrier having a third wavelength with a digital electrical data signal at the data service hub;

15 propagating the first and second analog optical carriers and digital optical carrier through separate optical waveguides away from the data service hub;

combining the first and second analog optical carriers together with the digital optical carrier;

propagating the combined optical carriers through one optical waveguide towards a subscriber;

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73. The method of Claim 72, further comprising selecting one of the analog optical carriers at a subscriber optical interface.

74. The method of Claim 72, further comprising separating the analog
25 optical carriers from the digital optical carrier at a subscriber optical interface.

75. The method of Claim 72, further comprising:

converting the digital optical carrier to a digital electrical data signal at a subscriber optical interface; and

30 filtering the digital electrical data signal.